CLAIMS:

WE CLAIM:

1. A method of improving the precision of acquired intensity ratio data, said method comprising the steps of:

a. causing at least one wavelength in an electromagnetic beam to enter a detector without first interacting with a sample system, to the end that said detector produces a representative intensity signal;

b. causing said at least one wavelength in said electromagnetic beam to interact with a sample system and enter a detector, to the end that said detector produces a representative intensity signal;

c. causing said at least one wavelength in said electromagnetic beam to enter a detector without first interacting with a sample system, to the end that said detector produces a representative intensity signal;

d. forming a ratio of the intensities provided in steps a and c and if it is not within a selected acceptable range of deviation from 1.0, repeating steps a, b and c until a data set is achieved which provides a ratio formed between the intensities provided in steps a and c is within a selected acceptable range of deviation from, 1.0;

e. with a data set achieved which provides that a ratio formed between the intensities provided in steps a and c is within a selected acceptable range of deviation from, 1.0, forming a ratio between the intensity provided in step b and that provided by

step a or step c or a composite of said intensities provided in steps a and c.

2. A method of improving the precision of acquired intensity ratio data, said method comprising the steps of:

a. providing beam of electromagnetism and causing it to be divided into first and second electromagnetic beams by a beam splitting means;

b. causing at least one wavelength in said first electromagnetic beam to enter a first detector without first interacting with a sample system, to the end that said first detector produces a representative intensity signal;

c1. simultaneously with step b causing said at least one wavelength in said second electromagnetic beam to enter a second detector without first interacting with a sample system, to the end that said second detector produces a representative intensity signal;

performing steps c2 and d in either order:

c2. causing said at least one wavelength in said second electromagnetic beam to interact with a sample system and enter the same detector used in step c1 to the end that said detector produces a representative intensity signal;

d. forming a ratio of the intensities provided in steps b and c1 and if it is not within a selected acceptable range of deviation from a determined expected value applying a calibration factor to intensity data obtained from the detector used in step b and/or c1;

e. with any calibration factor to intensity data applied, with

a data set achieved which provides that a ratio formed between the intensities provided in steps b and c1 is within a selected acceptable range of deviation from a determined expected value, forming a ratio between the intensity provided in step c2 and that provided by step b or step c1 or a composite of said intensities provided in steps b and c1;

to the end that intensity ratio data is acquired;

said method then optionally further involving performing steps f1, f2 and f3, said steps f1, f2 and f3 being:

f1. causing at least one wavelength in said first electromagnetic beam to enter said first detector without first interacting with a sample system, to the end that said first detector produces a representative intensity signal;

f2. simultaneous with step f1 causing said at least one wavelength in said second electromagnetic beam to enter said second detector without first interacting with a sample system, to the end that said second detector produces a representative intensity signal;

f3. forming a ratio of the intensities provided in steps f1 and f2 and if it is not within a selected acceptable range of deviation from a determined expected value, repeating steps a - e.

3. A method of improving the precision of acquired spectrophotometer intensity ratio data, said method comprising the steps of:

a. providing a spectrophotometer system including a spectroscopic source of a beam of electromagnetic radiation and monochrometer for allowing selecting of or scanning a range of

wavelengths, a means for supporting a sample system, and a detector system; said spectophotometer system being configurable such that a produced beam of electromagnetic radiation is caused to interact with said sample system and enter said detector system;

b1. causing said monochrometer to scan a selected range of wavelengths while obtaining a first baseline reference intensity data set;

b2. causing said monochrometer to scan said selected range of wavelengths while obtaining a sample system investigation intensity data set;

b3. causing said monochrometer to scan said selected range of wavelengths while obtaining a second baseline reference intensity data set; and

c. at selected wavelength(s) whereat the ratio in said baseline reference intensity values obtained in steps b1 and b3 is within some selected range substantially near 1.0, utilizing baseline reference intensity data obtained in step b1 or b3 or a composite value of the step b1 and b3 baseline reference intensity data, to form a ratio with said sample system investigation intensity data obtained in b2; and

d. identifying a wavelength at which the ratio of said baseline reference intensity values obtained in steps b1 and b3 is not within said selected range substantially near 1.0, and setting said monochrometer to pass said identified wavelength; then without changing said monochrometer setting obtaining:

d1. first baseline reference intensity data;

d2. sample system investigation intensity data;

d3. second baseline reference intensity data; and

e. utilizing first and second baseline reference intensity data obtained in step d1 or d3 or a composite value of the baseline reference intensity data obtained in step d1 and d3, and using said baseline reference intensity data obtained in step d1 or d3 or a composite value thereeof to form a ratio with said sample system investigation intensity data obtained in d2 at wavelengths whereat the ratio in said intensity values obtained in steps d1 and d3 is within some selected range substantially near 1.0;

f. optionally repeating steps d and e for additional wavelength(s) at which the ratio in said intensity values obtained in steps b1 and b3 is not within said selected range substantially near 1.0.

4. A method of improving the precision of acquired spectrophotometer intensity ratio data as in Claim 3, in which the step of providing a spectrophotometer system involves orienting the detector system to receive electromagnetic radiation which reflects from a sample system.

5. A method of improving the precision of acquired spectrophotometer intensity ratio data as in Claim 3, in which the step of providing a spectrophotometer system involves orienting the detector system to receive electromagnetic radiation which transmits through a sample system.

6. A method of improving the precision of acquired spectrophotometer intensity ratio data, said method comprising the steps of:

a. providing a spectrophotometer system including a spectroscopic source of a beam of electromagnetic radiation and

monochrometer for allowing selecting of or scanning a range of wavelengths, a means for supporting a sample system, and a detector system; said spectophotometer system being configurable such that a produced beam of electromagnetic radiation is caused to interact with said sample system and enter said detector system;

b1. causing said monochrometer to scan a selected range of wavelengths while obtaining a first baseline reference intensity data set;

b2. causing said monochrometer to scan said selected range of wavelengths while obtaining sample system investigation intensity data set;

b3. causing said monochrometer to scan said selected range of wavelengths while obtaining a second baseline reference intensity data set; and

c. at selected wavelength(s) whereat the ratio in said baseline reference intensity values obtained in steps b1 and b3 is within some selected range substantially near 1.0, utilizing baseline reference intensity data obtained in step b1 or b3, or a composite value of the baseline reference intensity data obtained in steps b1 and b3 as baseline reference intensity data, to form a ratio with said sample system investigation intensity data obtained in b2; and

d. identifying a plurality of wavelengths at which the ratio in said baseline reference intensity values obtained in steps b1 and b3 is not within said selected range substantially near 1.0, and for each of at least two thereof:

d1. causing said monochrometer to scan said at least two of

said plurality of identified wavelengths while obtaining a first baseline reference intensity data set;

d2. causing said monochrometer to scan said at least two of said plurality of identified wavelengths while obtaining a sample system investigation intensity data set;

d3. causing said monochrometer to scan said at least two of said plurality of identified wavelengths while obtaining a second baseline reference intensity data set;

e. for at least one of said at least two wavelengths utilizing first or second baseline reference intensity data obtained in step d1 or d3, or a composite value of the baseline reference intensity data obtained in steps d1 and d3 as a baseline reference intensity data, to form a ratio with said sample system investigation intensity data obtained in d2;

f. optionally repeating steps d - e.

7. A method of improving the precision of acquired spectrophotometer intensity ratio data as in Claim 6, in which the step of providing a spectrophotometer system involves orienting the detector system to receive electromagnetic radiation which reflects from a sample system.

8. A method of improving the precision of acquired spectrophotometer intensity ratio data as in Claim 6, in which the step of providing a spectrophotometer system involves orienting the detector system to receive electromagnetic radiation which transmits through a sample system.

9. A method of improving the precision of acquired spectrophotometer intensity ratio data, said method comprising the steps of:

a. providing a spectrophotometer system including a spectroscopic source of a beam of electromagnetic radiation, a means for supporting a sample system, and a detector system; said spectophotometer system being configurable such that a produced beam of electromagnetic radiation is caused to interact with said sample system and enter said detector system;

b. for each of a plurality of wavelengths obtaining, in any functional order, intensity data corresponding to:

b1. a first baseline reference intensity data;

b2. sample system investigation intensity data;

b3. a second baseline reference intensity data; and

c. repeating said step b to reacquire all data if at any selected wavelength(s) the ratio between the first and second baseline reference intensity data acquired in steps b1 and b3 is not within a selected range substantially near 1.0; and

d. with an acceptable set of intensity data secured, at selected wavelength(s) utilizing said baseline reference intensity data obtained in step b1 or b3 or a composite value of the baseline intensity values obtained in steps b1 and b3, forming a ratio with said sample system investigation intensity data obtained in step b2.

10. A method of improving the precision of acquired spectrophotometer intensity ratio data as in Claim 9, in which the step of providing a spectrophotometer system involves orienting the multiple element detector system to receive electromagnetic radiation which reflects from a sample system.

11. A method of improving the precision of acquired

spectrophotometer intensity ratio data as in Claim 9, in which the step of providing a spectrophotometer system involves orienting the multiple element detector system to receive electromagnetic radiation which transmits through a sample system.

12. A method of improving the precision of acquired spectrophotometer intensity ratio data, said method comprising the steps of:

a. providing a spectrophotometer system including a spectroscopic source of a beam of electromagnetic radiation, a means for supporting a sample system, and a multiple element detector system; said spectophotometer system being configurable such that a produced beam of electromagnetic radiation is caused to interact with said sample system and enter said multiple element detector system;

b. for each of a plurality of wavelengths simultaneously obtaining, in any functional order, intensity data corresponding to:

b1. a first baseline reference intensity data;

b2. sample system investigation intensity data;

b3. a second baseline reference intensity data; and

c. repeating said step b to reacquire all data if at any selected wavelength(s) the ratio between the first and second baseline reference intensity data acquired in steps b1 and b3 is not within a selected range substantially near 1.0; and

d. with an acceptable set of intensity data simultaneously

secured, at selected wavelength(s) utilizing said baseline reference intensity data obtained in step b1 or b3 or a composite value of the baseline intensity values obtained in steps b1 and b3, to form a ratio with said sample system investigation intensity data obtained in step b2.

13. A method of improving the precision of acquired spectrophotometer intensity ratio data as in Claim 12, in which the step of providing a spectrophotometer system involves orienting the multiple element detector system to receive electromagnetic radiation which reflects from a sample system.

14. A method of improving the precision of acquired spectrophotometer intensity ratio data as in Claim 12, in which the step of providing a spectrophotometer system involves orienting the multiple element detector system to receive electromagnetic radiation which transmits through a sample system.

15. A method of improving the precision of acquired spectrophotometer intensity ratio data, said method comprising the steps of:

a. providing a spectrophotometer system including a spectroscopic source of a beam of electromagnetic radiation, a means for supporting a sample system, and a detector system; said spectophotometer system being configurable such that a produced beam of electromagnetic radiation is caused to interact with said sample system and enter said detector system;

b. for each of a plurality of wavelengths obtaining, in any functional order, intensity data corresponding to:

b1. first baseline reference intensity data;

b2. sample system investigation intensity data;

b3. second baseline reference intensity data; and

c. at selected wavelength(s) utilizing said baseline reference intensity data obtained in step b1 or b3 or a composite value formed said baseline intensity data obtained in steps b1 and b3, to form a ratio with said sample system investigation intensity data obtained in step b2 if a ratio between the first and second baseline reference intensity data acquired in steps b1 and b3 is within a selected range which is in a range substantially near 1.0; and

d. identifying at least one selected wavelength(s) whereat the ratio between the first and second baseline reference intensity data acquired in steps b1 and b3 is not within a selected range substantially near 1.0, reacquiring baseline reference intensity data and sample system investigation intensity data and utilizing said reacquired baseline reference intensity data in forming a ratio with said reacquired sample system investigation intensity data.

16. A method of improving the precision of acquired spectrophotometer intensity ratio data as in Claim 15, in which the step of providing a spectrophotometer system involves orienting the multiple element detector system to receive electromagnetic radiation which reflects from a sample system.

17. A method of improving the precision of acquired spectrophotometer intensity ratio data as in Claim 15, in which the step of providing a spectrophotometer system involves orienting the multiple element detector system to receive electromagnetic radiation which transmits through a sample system.

18. A method of improving the precision of acquired spectrophotometer intensity ratio data, said method comprising the steps of:

a. providing a spectrophotometer system including a spectroscopic source of a beam of electromagnetic radiation, a means for supporting a sample system, and a multiple element detector system; said spectophotometer system being configurable such that a produced beam of electromagnetic radiation is caused to interact with said sample system and enter said multiple element detector system;

b. for each of a plurality of wavelengths simultaneously obtaining, in any functional order, intensity data corresponding to:

b1. first baseline reference intensity data;

b2. sample system investigation intensity data;

b3. second baseline reference intensity data; and

c. at selected wavelength(s) utilizing said baseline reference intensity data obtained in step b1 or b3 or a composite value of the baseline reference intensity values obtained in steps b1 and b3, to form a ratio with said sample system investigation intensity data obtained in step b2 if a ratio between the first and second baseline reference intensity data acquired in steps b1 and b3 is within a selected range which is in a range substantially near 1.0; and

d. reacquiring baseline reference intensity data and sample system investigation intensity data at at least one selected wavelength(s) whereat the ratio between the first and second

baseline reference intensity data acquired in steps b1 and b3 is not within a selected range substantially near 1.0, and utilizing said reacquired baseline reference intensity data in forming a ratio with said reacquired sample system investigation intensity data.

19. A method of improving the precision of acquired spectrophotometer intensity ratio data as in Claim 18, in which the step of providing a spectrophotometer system involves orienting the multiple element detector system to receive electromagnetic radiation which reflects from a sample system.

20. A method of improving the precision of acquired spectrophotometer intensity ratio data as in Claim 18, in which the step of providing a spectrophotometer system involves orienting the multiple element detector system to receive electromagnetic radiation which transmits through a sample system.

21. A method of improving the precision of acquired spectrophotometer intensity ratio data, said method comprising the steps of:

a. providing a spectrophotometer system including a spectroscopic source of a beam of spectroscopic electromagnetic radiation and monochrometer for allowing selecting of wavelengths, a beam splitter means, a means for providing a sample system and first and second detector systems; said spectophotometer system being configurable such that a produced beam of electromagnetic radiation is caused be split into two beams by said beam splitter means, one of said two beams being caused to either enter said first detector directly or interact with a sample system and then enter said first detector system; and the other of said two beams being caused to enter directly

into said second detector;

b. setting said monochrometer to pass a selected wavelength; then without changing said monochrometer setting obtaining:

b1. baseline reference intensity data from said second detector; and

b2. obtaining, in either order, intensity data from said first detector both with a sample system present and for baseline reference with the sample system removed;

c. forming a ratio between the baseline intensity data obtained in step b1, and the intensity data obtained in step b2 which was obtained with the sample system removed, and

if a ratio between said baseline reference intensity data is within a selected range substantially near a determined expected value, using the baseline intensity data obtained in step b1, or the intensity data obtained in step b2 which was obtained with the sample system removed, or a composite thereof to form a ratio with the intensity data obtained in step b2 which was obtained with the sample system present; but

if the ratio between the baseline intensity data obtained in step b1, and the intensity data obtained in step b2 which was obtained with the sample system removed is not within a selected range substantially near a determined expected value, then performing a selection from the group consisting of:

repeating steps b and c; and

applying a correction factor to the intensity data obtained from said second and/or first detector with the sample

system removed in step b2;

to the end that the ratio between the baseline intensity data obtained in step b1, and the intensity data obtained in step b2 which was obtained with the sample system removed is within a selected range substantially near a determined expected value,

and then with any correction factor to the intensity data obtained from said second and/or first detector applied, forming a ratio between intensity data obtained in step b2 from said first detector obtained with a sample system present to baseline intensity data obtained in step b1, or the intensity data obtained in step b2 which was obtained with the sample system removed, or a composite of the baseline intensity data obtained in step b1 and the intensity data obtained in step b2 which was obtained with the sample system removed;

said method further comprising steps d1, d2 and d3, wherein said steps d1, d2 and d3 are:

d1. without changing the monochrometer setting causing said set wavelength in said first electromagnetic beam to enter said first detector without first interacting with a sample system, to the end that said first detector produces a representative intensity signal;

d1. simultaneous with step d1 causing said set wavelength in said second electromagnetic beam to enter said second detector without first interacting with a sample system, to the end that said second detector produces a representative intensity signal;

d3. forming a ratio of the intensities provided in steps d1 and d2 and if it is not within a selected acceptable range of deviation from a determined expected value optionally repeating

steps a - c.

22. A method of improving the precision of acquired spectrophotometer intensity ratio data as in Claim 21, in which the step of providing a spectrophotometer system involves orienting the multiple element detector system to receive electromagnetic radiation which reflects from a sample system.

23. A method of improving the precision of acquired spectrophotometer intensity ratio data as in Claim 21, in which the step of providing a spectrophotometer system involves orienting the multiple element detector system to receive electromagnetic radiation which transmits through a sample system.

24. A method of improving the precision of acquired spectrophotometer intensity ratio data, said method comprising the steps of:

a. providing a spectrophotometer system including a spectroscopic source of a beam of spectroscopic electromagnetic radiation, a beam splitter means, a means for providing a sample system and first and second multi-element detector systems; said spectophotometer system being configurable such that a produced beam of electromagnetic radiation is caused be split into two beams by said beam splitter means, one of said two beams being caused to either enter directly into said first multi-element detector or interact with a sample system and then enter said first multi-element detector system; and the other of said two beams being caused to enter directly into said second multi-element detector;

b. for a plurality of wavelengths simultaneously obtaining:

b1. baseline reference intensity data from said second multi-element detector; and

b2. obtaining, in either order, intensity data from said first multi-element detector both with a sample system present and for baseline reference with the sample system removed;

c. at at least some wavelengths forming a ratio between the baseline intensity data obtained in step b1, and the intensity data obtained in step b2 which was obtained with the sample system removed, and

if, for a wavelength, a ratio between said baseline reference intensity data is within a selected range substantially near a determined expected value, using the baseline intensity data obtained in step b1, or the intensity data obtained in step b2 which was obtained with the sample system removed, or a composite formed from the baseline intensity data obtained in step b1 and the intensity data obtained in step b2 which was obtained with the sample system removed, to form a ratio with the intensity data obtained in step b2 which was obtained with the sample system present; but

if, for a wavelength, a ratio between the baseline intensity data obtained in step b1, and the intensity data obtained in step b2 which was obtained with the sample system removed is not within a selected range substantially near a determined expected value, then performing a selection from the group consisting of:

repeating steps b and c; and

applying a correction factor to the intensity data obtained from said second and/or first detector with the sample

system removed in steps b1 and b2 respectively;

to the end that the ratio between the baseline intensity data obtained in step b1, and the intensity data obtained in step b2 which was obtained with the sample system removed is within a selected range substantially near a determined expected value;

and then with any correction factor to the intensity data obtained from said second and/or first detector applied, forming a ratio between resulting intensity data related to step b2 from said first detector obtained with a sample system present to the baseline intensity data obtained in step b1, or the intensity data obtained in step b2 which was obtained with the sample system removed, or a composite of the baseline intensity data obtained in step b1 and the intensity data obtained in step b2 which was obtained with the sample system removed, with any required calibration factor being applied to the intensity data obtained from said second or first detector with the sample system removed in steps b1 and b2;

to the end that intensity ratio data is acquired;

said method further comprising steps d1, d2 and d3, wherein said steps d1, d2 and d3 are:

d1. causing at least one wavelength in said first electromagnetic beam to enter said first detector without first interacting with a sample system, to the end that said first detector produces a representative intensity signal;

d1. simultaneous with step d1 causing said at least one wavelength in said second electromagnetic beam to enter said second detector without first interacting with a sample system, to the end that said second detector produces a representative

intensity signal;

d3. at said at least one wavelength forming a ratio of the intensities provided in steps d1 and d2 and if it is not within a selected acceptable range of deviation from a determined expected value optionally repeating steps a - c for at least said at least one wavelength.

25. A method of improving the precision of acquired spectrophotometer intensity ratio data as in Claim 24, in which the step of providing a spectrophotometer system involves orienting the multiple element detector system to receive electromagnetic radiation which reflects from a sample system.

26. A method of improving the precision of acquired spectrophotometer intensity ratio data as in Claim 24, in which the step of providing a spectrophotometer system involves orienting the multiple element detector system to receive electromagnetic radiation which transmits through a sample system.

27. A method of improving the precision of acquired spectrophotometer intensity ratio data, said method comprising the steps of:

a. providing a spectrophotometer system including a spectroscopic source of a beam of electromagnetic radiation and monochrometer for allowing selecting of wavelengths, a means for supporting a sample system and a detector system; said spectophotometer system being configurable such that a produced beam of electromagnetic radiation is caused to impinge upon a reference surface of a sample system placed on said means for supporting a sample system at an oblique angle thereto and enter said detector system;

b. setting said monochrometer to pass a selected wavelength; then without changing said monochrometer setting obtaining, in any functional order:

b1. baseline reference intensity data; and

b2. sample system investigation intensity data;

c. utilizing said baseline reference intensity data to form a ratio with said sample system investigation intensity data;

d. optionally repeating said steps b and c for different monochrometer settings.

28. A method of improving the precision of acquired spectrophotometer intensity ratio data as in Claim 27, in which the step of providing a spectrophotometer system involves orienting the detector system to receive electromagnetic radiation which reflects from said sample system at said oblique angle.

29. A method of improving the precision of acquired spectrophotometer intensity ratio data as in Claim 27, in which the step of providing a spectrophotometer system involves orienting the detector system to receive electromagnetic radiation which transmits through said sample system at said oblique angle.

30. A method of improving the precision of acquired spectrophotometer intensity ratio data, said method comprising the steps of:

a. providing a spectrophotometer system including a spectroscopic source of a beam of electromagnetic radiation and a monochromator for allowing selecting of wavelengths, a means for

supporting a sample system and a detector system; said spectophotometer system being configurable such that a produced beam of electromagnetic radiation is caused to impinge upon a reference surface of a sample system placed on said means for supporting a sample system at an oblique angle thereto, and enter said detector system;

b. setting said monochrometer to pass a selected wavelength; then without changing said monochrometer setting obtaining, in any functional order:

b1. a first baseline reference intensity data;

b2. sample system investigation intensity data;

b3. a second baseline reference intensity data; and

c. utilizing said baseline reference intensity data obtained in step b1 or b3, or a composite value of the baseline reference intensity values obtained in steps b1 and b3, to form a ratio with said sample system investigation intensity data obtained in step b2;

d. optionally repeating said steps b and c for different monochrometer settings.

31. A method of improving the precision of acquired spectrophotometer intensity ratio data as in Claim 30, in which the step of providing a spectrophotometer system involves orienting the detector system to receive electromagnetic radiation which reflects from said sample system at said oblique angle.

32. A method of improving the precision of acquired

spectrophotometer intensity ratio data as in Claim 30, in which the step of providing a spectrophotometer system involves orienting the detector system to receive electromagnetic radiation which transmits through said sample system at said oblique angle.

33. A method of improving the precision of acquired spectrophotometer intensity ratio data, said method comprising the steps of:

a. providing a spectrophotometer system including a spectroscopic source of a beam of electromagnetic radiation and monochrometer for allowing selecting of wavelengths, a means for supporting a sample system and a multi-element detector system; said spectophotometer system being configurable such that a produced beam of electromagnetic radiation is caused to impinge upon a reference surface of a sample system placed on said means for supporting a sample system at an oblique angle thereto and enter said multi-element detector system;

b. for a plurality of wavelengths, simultaneously obtaining, in any functional order:

b1. baseline reference intensity data; and

b2. sample system investigation intensity data;

c. at at least one wavelength utilizing said baseline reference intensity data to form a ratio with corresponding sample system investigation intensity data;

d. optionally repeating said steps b and c for different wavelength(s).

34. A method of improving the precision of acquired spectrophotometer intensity ratio data as in Claim 33, in which the step of providing a spectrophotometer system involves orienting the detector system to receive electromagnetic radiation which reflects from said sample system at said oblique angle.

35. A method of improving the precision of acquired spectrophotometer intensity ratio data as in Claim 33, in which the step of providing a spectrophotometer system involves orienting the detector system to receive electromagnetic radiation which transmits through said sample system at said oblique angle.

36. A method of improving the precision of acquired spectrophotometer intensity ratio data, said method comprising the steps of:

a. providing a spectrophotometer system including a spectroscopic source of a beam of electromagnetic radiation, a means for supporting a sample system and a multi-element detector system; said spectophotometer system being configurable such that a produced beam of electromagnetic radiation is caused to impinge upon a reference sample system placed on said means for supporting a sample system at an oblique angle thereto, and enter said multi-element detector system;

b. for a plurality of wavelengths, simultaneously obtaining, in any functional order:

b1. a first baseline reference intensity data;

b2. sample system investigation intensity data;

b3. a second baseline reference intensity data; and

c. at at least one wavelength utilizing said baseline reference intensity data obtained in step b1 or b3, or a composite value of the baseline reference intensity values obtained in steps b1 and b3, to form a ratio with corresponding said sample system investigation intensity data obtained in step b2;

d. optionally repeating said steps b and c for different wavelength(s).

37. A method of improving the precision of acquired spectrophotometer intensity ratio data as in Claim 36, in which the step of providing a spectrophotometer system involves orienting the multi-element detector system to receive electromagnetic radiation which reflects from said sample system at said oblique angle.

38. A method of improving the precision of acquired spectrophotometer intensity ratio data as in Claim 36, in which the step of providing a spectrophotometer system involves orienting the multi-element detector system to receive electromagnetic radiation which transmits through said sample system at said oblique angle.

39. A method of improving the precision of acquired spectrophotometer intensity ratio data as in Claim 1, in which the step of providing a spectrophotometer system involves orienting the detector system to receive electromagnetic radiation which reflects from a sample system.

40. A method of improving the precision of acquired spectrophotometer intensity ratio data as in Claim 1, in which the step of providing a spectrophotometer system involves orienting the detector system to receive electromagnetic

radiation which transmits through a sample system.

41. A method of improving the precision of acquired spectrophotometer intensity ratio data as in Claim 2, in which the step of providing a spectrophotometer system involves orienting the detector system to receive electromagnetic radiation which reflects from a sample system.

42. A method of improving the precision of acquired spectrophotometer intensity ratio data as in Claim 2, in which the step of providing a spectrophotometer system involves orienting the detector system to receive electromagnetic radiation which transmits through a sample system.

43. A method of improving the precision of acquired intensity ratio data as in Claim 2, in which the determined expected value is 1.0.

44. A method of improving the precision of acquired spectrophotometer intensity ratio data as in Claim 21, wherein the baseline reference intensities obtained in steps b1 and b2 are obtained simultaneously.

45. A method of improving the precision of acquired spectrophotometer intensity ratio data as in Claim 24, wherein the baseline reference intensities obtained in steps b1 and b2 are obtained simultaneously.